

Basic Need Satisfaction and Identity Formation: Bridging Self-Determination Theory and Process-Oriented Identity Research

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The fulfillment of the basic psychological needs for autonomy, competence, and relatedness as postulated within self-determination theory was hypothesized to play an energizing role in identity formation, conceptualized as multiple dimensions of exploration and commitment. Two studies among high school and college students ($N = 714$) were conducted to investigate (a) the cross-sectional relationships between need satisfaction and the identity dimensions and (b) the direction of effects using cross-lagged analyses. Three competing longitudinal models were tested: a need satisfaction main-effects model, an identity main-effects model, and a reciprocal effects model. All 3 needs had meaningful relationships with the identity dimensions, and, although there was a predominance of paths from the needs to the identity dimensions, the reciprocal effects model received most support. Further, identity statuses (representing multivariate combinations of the identity dimensions) were meaningfully related to satisfaction of the 3 needs, with identity achievement scoring highest on all 3 indices of need satisfaction. Suggestions for future research and counseling implications are discussed.

Keywords: identity, need satisfaction, commitment, exploration, self-determination theory

Forming an integrated and personalized sense of identity is a pivotal developmental task in late adolescence and emerging adulthood (Erikson, 1968). Erikson highlighted the central role of identity development in facilitating personal functioning and well-being, with identity synthesis and identity confusion being the polar outcomes of the identity crisis occurring in late adolescence. A better developed identity structure allows individuals to be more aware of their personal strengths and weaknesses, which facilitates psychosocial well-being. In contrast, less developed identity structures leave individuals confused and vulnerable for ill-being. Identity development is therefore generally viewed as a core issue in counseling youngsters who struggle with their self-definition (Schultheiss & Blustein, 1994). Hence, researchers need to examine factors that energize young people to put an effort into identity-related work and that optimize young people's opportunities to attain an integrated sense of identity. Conversely, researchers may want to investigate factors that protect young people against re-

gressing into an identity-diffused state or against relying on maladaptive identity strategies that put them on a less than optimal identity pathway. In the present study, we attempted to identify such a set of processes by focusing on the concept of basic need satisfaction as put forward within self-determination theory (SDT; Ryan & Deci, 2000; Vansteenkiste, Ryan, & Deci, 2008). Further, we also investigated the extent to which identity formation allows for greater basic need satisfaction, as postulated by some authors (e.g., Ryan & Deci, 2003). Before proceeding to the hypotheses of the present study, we discuss the concepts of identity and basic need satisfaction as grounded in Marcia's (1966) and Deci and Ryan's (2000) theories on personal identity and motivational dynamics, respectively.

Dimensions of Identity Formation

Forming a sense of identity can be challenging for young people today. The gradual conversion into late-modern society has led to an expansion of options for individual development and growth (Arnett, 2000). Although such a cultural setting might hold promising opportunities for individuals who thrive under such conditions, the ever-expanding set of options and alternatives can induce confusion in young people for whom these seemingly unlimited possibilities are overwhelming. Indeed, these observations have led some authors to argue that freedom can be tyrannizing rather than liberating (e.g., B. Schwartz, 2000). Within such a context, some individuals might get stuck in the exploration process and experience difficulty arriving at firm identity choices (S. J. Schwartz, Côté, & Arnett, 2005). In line with these ideas, and

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inspired by Marcia's (1966) identity status paradigm and more recent process models of identity (Bosma & Kunnen, 2001; Grotevant, 1987), Luyckx, Schwartz, et al. (2008) developed an identity formation model comprising five separate but interrelated identity dimensions to capture identity formation in contemporary times.

Marcia (1966) introduced the dimensions of exploration and commitment to capture individual differences in the way adolescents approach identity issues and form identity commitments. In doing so, he mainly focused on decision-making dimensions that were behavioral markers of personal identity formation. Exploration was defined as the degree to which adolescents search for different alternatives with respect to their goals, values, and convictions. Commitment was defined as the degree to which adolescents have made invested choices about important identity-relevant issues. By crossing these dimensions, Marcia derived four identity statuses or types: *achievement* (high commitment, high exploration), *foreclosure* (high commitment, low exploration), *moratorium* (low commitment, high exploration), and *diffusion* (low commitment, low exploration).

Extending Marcia's identity model, Luyckx, Goossens, Soenens, and Beyers (2006) relabeled the former type of exploration *exploration in breadth*, and they also introduced a second type of exploration: *exploration in depth*. In line with researchers who stressed that exploration may also entail an in-depth evaluation of one's already existing commitments and choices (e.g., Bosma & Kunnen, 2001), the latter dimension refers to whether adolescents gather information and talk to others about their current commitments to judge how well these commitments fit with their personal goals and standards. Further, as noted, commitment was originally defined as the degree to which adolescents have made firm identity choices (relabeled *commitment making* by Luyckx, Goossens, Soenens, & Beyers, 2006). Grotevant (1987) argued, however, that, apart from the degree to which one has made identity commitments, the degree to which adolescents identify with and feel certain about their choices or commitments (i.e., *identification with commitment*) is an important component of identity formation as well.

These four identity dimensions were integrated into a single model capturing identity development (Luyckx, Goossens, & Soenens, 2006; Luyckx, Goossens, Soenens, & Beyers, 2006). Most recently, Luyckx, Schwartz, et al. (2008) extended this four-dimensional model by including a fifth dimension, that is, *ruminative exploration*. This dimension captures an identity exploration process characterized by hesitation, indecisiveness, and flawed decision making (Trapnell & Campbell, 1999). As such, the resulting five-dimensional model is suited to capture both adaptive and maladaptive identity dimensions. Given that several studies have shown that such identity processes can be enhanced by means of interventions (e.g., S. J. Schwartz, Kurtines, & Montgomery, 2005), this model is suited to provide counselors more insight into how to approach individuals struggling with their self-definition.

States or Types of Identity Formation

It is important to note that these identity dimensions are not evidenced by all individuals to the same degree. Person-centered analyses are needed to capture the heterogeneity of different groups or types of individuals, each characterized by their own

profile scores on these dimensions. Six types of individuals, representing different multivariate combinations of low to high scores on these five identity dimensions, were identified through cluster analysis in previous research (Luyckx, Schwartz, et al., 2008). Some of these clusters resembled the four statuses of Marcia (1966), but refinements of Marcia's classification scheme were needed, as five instead of two dimensions were used.

First, in line with its original conception, *achievement* was characterized by high scores on commitment making and exploration in breadth. Additionally, achieved individuals were found to score high on identification with commitment and exploration in depth and low on ruminative exploration. Second, equally in line with its original conception, *foreclosure* was characterized by high scores on commitment making and low scores on exploration in breadth. Additionally, foreclosed individuals scored high on identification with commitment and low on exploration in depth and ruminative exploration, although their commitment scores were not as high as those of achieved individuals. Apparently, for these individuals, lack of exploration goes hand in hand with less strong and fewer self-endorsed identity commitments when compared with the scores of achieved individuals.

Third, individuals in moratorium were characterized by low scores on commitment making and high scores on exploration in breadth. These individuals were also found to score high on exploration in depth and ruminative exploration. Apparently, the crisislike nature of this status described in the literature (e.g., Stephen, Fraser, & Marcia, 1992) is reflected in high scores on worry, doubt, and rumination with respect to exploring identity issues. Consequently, this cluster was labeled *ruminative moratorium*. Individuals in this status are most likely to seek counseling because of their "in-crisis" position with respect to identity. The fact that they are exploring various alternatives without being able to focus on a limited set of options might provoke anxiety (Kroger, 2003). The psychosocial costs of a nondesisting, unremitting identity search can be substantial for some individuals and, as a consequence, individuals in this status might benefit from guidance and structured interventions. However, given the positive function of exploration of identity alternatives on the pathway to establishing a sense of adult identity, counselors might do well to provide structure without denying voice with respect to desired identity options.

Fourth, individuals in the diffusion status were described as scoring low on commitment making and low to moderate on exploration in breadth. Luyckx, Schwartz, et al. (2008) identified two separate diffusion clusters, both characterized by low scores on the commitment dimensions and low to moderate scores on exploration in breadth and in depth. Whereas *diffused diffusion* was additionally characterized by a high score on ruminative exploration and was the least adjusted profile of the two clusters, *carefree diffusion* was additionally characterized by a low score on ruminative exploration and higher adjustment scores. Finally, an *undifferentiated* cluster was identified, characterized by moderate scores on all five identity dimensions and moderate levels of adjustment.

Basic Need Satisfaction

Mapping out the identity dimensions and the statuses that can be derived from them to meaningfully classify young people is an

important task for identity researchers. Another important question is which variables can explain why some people move through the identity process quite easily, whereas others get stuck in a diffused or ruminative state. Given the fact that identity formation has such important ramifications for well-being and psychosocial functioning, there is a need to identify individual differences that can account for this variation. Recent research has begun to study the antecedents of the dimensions constituting the identity formation model described earlier. In this respect, it has been shown, for instance, that autonomy-supportive parenting (Luyckx, Soenens, Goossens, & Vansteenkiste, 2007) and intrapersonal perfectionism (Luyckx, Soenens, Goossens, Beckx, & Wouters, 2008) are meaningfully associated with the different exploration and commitment dimensions.

Identifying such processes is instructive from both salutogenic and pathogenic points of view (e.g., Wei, Shaffer, Young, & Zakalik, 2005), as identity development can lead to both well-being and distress (or even pathology in the case of a problematic identity pathway). A prime candidate in this respect is the amount of basic need satisfaction individuals experience in their daily lives, a concept advanced in SDT. SDT is a broad-based motivation theory that endorses the role of a set of psychological needs in determining human behavior and decision making (Deci & Ryan, 2000; Vansteenkiste et al., 2008).

SDT posits that individuals continuously strive to satisfy the three complementary basic psychological needs of autonomy, competence, and relatedness (Ryan & Deci, 2000). The need for autonomy refers to an individual's need to experience choice in the initiation, maintenance, and regulation of behavior. When this need is satisfied, the individual feels a sense of psychological freedom in his or her actions. The need for competence refers to an individual's need to succeed at optimally challenging tasks and to be able to attain desired outcomes. Satisfaction of this need leads to perceptions of mastery, personal success, and control of outcomes. Finally, the need for relatedness refers to an individual's need to establish a sense of mutual respect and connectedness with important others. Satisfaction of this need results in a feeling of being supported by a social network. SDT argues that these three basic psychological needs determine human behavior across different situations and contexts because they propel and instigate a wide variety of human behavior (Deci & Ryan, 2000). The satisfaction of these three basic psychological needs promotes optimal functioning, daily well-being, and the realization of one's growth tendencies. To the extent that these needs are thwarted, individuals regress to a state of passivity, ill-being, and alienated functioning (Deci & Ryan, 2000). Cross-sectional and longitudinal research has confirmed the growth-promoting role of basic need satisfaction in various cultures around the world (e.g., Deci et al., 2001; Vansteenkiste, Zhou, Lens, & Soenens, 2005). Extending this research line, we suggest that individual differences in the extent to which these psychological needs have been met are important for an integrated versus derailed process of identity development.

Such a prediction can be derived from an integration of SDT and lifespan identity theorizing, which both converge on the metatheoretical tenet that humans are proactive organisms acting on their inner and outer environments to develop a more unified sense of self, providing the core of a healthier and more integrated functioning that represents a better expression of one's inner wishes, values, and standards (Ryan & Deci, 2003; Soenens, Berzonsky,

Vansteenkiste, Beyers, & Goossens, 2005). Further, both frameworks emphasize that identity formation does not occur in isolation and that intraindividual factors and the social environment might facilitate or hinder the development of a more self-endorsed and integrated mode of functioning.

Research Questions and Hypotheses

Despite the metatheoretical similarities of SDT and identity theorizing, previous research linking their core explanatory variables (i.e., basic need satisfaction and identity exploration and commitment) to one another is lacking. In the present study, we tried to provide an in-depth view on the link between basic need satisfaction and identity dimensions and statuses using both cross-sectional and longitudinal analytical strategies. Two samples were used in the present study, that is, a high school sample of 12th graders and a freshman college student sample, with the latter sample being used for the longitudinal research questions. As noted, young people who are in the transition to college or who embark on their college studies face not only a multitude of options and opportunities but also a number of uncertainties and challenges (Arnett, 2000). As such, 12th grade and the college freshman year are periods of intense identity explorations to determine one's choice of life path and to subsequently judge how well the chosen life path fits with one's own needs and wishes. It could be expected that, in general, exploration in breadth would be lower at the onset of university as compared with the end of high school because—with the hypothesized increase in commitment making in the university setting—the motivation to engage in exploration in breadth might decrease temporarily (Grotevant, 1987; Waterman, 1993). In sum, because the end of high school and the beginning of college might prove to be unstable and challenging times for young people, we decided to focus on these age groups to examine whether need satisfaction could constitute a resource for identity development.

In this study, three main research questions were addressed.

Research Question 1: Need Satisfaction and Identity Dimensions

We investigated how satisfaction of the three basic needs (i.e., autonomy, competence, and relatedness) was related to the five identity dimensions (i.e., commitment making, identification with commitment, exploration in breadth, exploration in depth, and ruminative exploration) at the cross-sectional level. We hypothesized that the experience of total need satisfaction in daily life provides individuals with the necessary energy to invest in identity-related efforts in the sense that satisfaction of these needs goes hand in hand with a proactive exploration of different identity issues and a commitment to and endorsement of certain identity options.

First, autonomy satisfaction would be accompanied by a personalized search for or exploration of identity issues. Indeed, the more one experiences a sense of freedom to pursue one's own interests and values, the more one is likely to thoroughly explore the different identity options at hand. In line with this assumption, it has been shown that the more adolescents are inclined to act in accordance with self-endorsed standards and values (i.e., to act autonomously), the more likely they are to seek out and evaluate

identity-relevant information (Soenens et al., 2005). This is likely to translate into a positive relation with exploration in breadth and in depth. Autonomy satisfaction is also expected to be negatively related to ruminative exploration. If individuals feel that they function in an autonomous fashion, they are unlikely to worry endlessly about which identity alternative would suit them best or which way they want to go in their lives. Such worries and self-doubts would be more likely to arise when people, for instance, feel (internally or externally) pressured to select an identity that does not fit their own interests and values. Further, in line with a self-discovery perspective on identity formation (Waterman, 1992), the psychological freedom accompanying autonomy satisfaction would lead individuals to behave according to their self-endorsed wishes and needs. This process would be beneficial for committing themselves to particular identity options and to identify with these commitments.

Second, we hypothesized that competence satisfaction would be positively related to both types of proactive exploration (i.e., exploration in breadth and in depth) because highly competent individuals would feel sufficiently equipped to engage in the identity exploration task. In contrast, we expected competence satisfaction to be negatively related to ruminative exploration. In line with this assumption, Guay, Senécal, Gauthier, and Fernet (2003) found that when individuals perceived themselves as less competent with respect to career decisions, they experienced a higher degree of indecision about career options. Further, we hypothesized that competence satisfaction would be positively related to the two commitment dimensions because individuals who experience a sense of effectiveness in pursuing their goals would be more capable of making decisions and forming self-endorsed identity commitments that they value and feel certain about.

Third, although relational support is likely to provide people with a sense of psychological security to safely explore the environment, it is also possible that some people engage in exploratory activities on their own, that is, without the support of significant others (Deci & Ryan, 2000). Indeed, autonomy and competence satisfaction are especially said to form the basis of intrinsically motivated curiosity and free exploration of the outer and inner world (Deci, 1975). As such, we hypothesized that relatedness satisfaction would only be moderately related (or even unrelated) to identity exploration. In contrast, relatedness satisfaction is hypothesized to be critical for the personal endorsement and identification with selected identities, because the support of significant others would allow one to become more strongly convinced of one's chosen identity (Ryan & Deci, 2003). Consequently, we hypothesized that relatedness satisfaction would be positively related to commitment making and identification with commitment.

Research Question 2: Need Satisfaction and Identity Statuses

Similar to the former research question, we also investigated how the three needs were related to the identity statuses. First, we hypothesized that the identity statuses identified by Luyckx, Schwartz, et al. (2008) would also emerge in the present study through the use of cluster analysis. Achievement would have high scores on all dimensions except for a low score on ruminative exploration. Foreclosure would have high scores on the commit-

ment dimensions (although not as high as the achievement status) and low scores on all three exploration dimensions. Ruminative moratorium would have low to moderate scores on the commitment dimensions and high scores on the exploration dimensions. Both diffusion clusters would involve low to moderate scores on all dimensions, except for a high score on ruminative exploration in the case of diffused diffusion. Finally, the undifferentiated cluster would display moderate scores on all dimensions. With respect to the link between these identity statuses and basic need satisfaction, we hypothesized that the achievement status—being an instantiation of a personalized search into one's identity coupled with the making of self-endorsed commitments with which one strongly identifies—would score highest on the three needs. Conversely, we expected that the diffusion statuses—diffused diffusion in particular—would score lowest on need satisfaction. We expected the other statuses to be situated between these two extremes, with scores in foreclosure higher than scores in ruminative moratorium on need satisfaction because of its higher scores on the commitment dimensions and its lower scores on ruminative exploration.

Research Question 3: Longitudinal Cross-Lagged Associations

Three competing cross-lagged models were tested in the present study to obtain a detailed view on the longitudinal dynamics present in the link between basic need satisfaction and the five identity dimensions: a need satisfaction main-effects model, an identity main-effects model, and a reciprocal effects model.

First, the need satisfaction main-effects model assumes that basic need satisfaction influences or drives developmental changes in identity. Such a model would be in line with several theoretical and empirical contributions that conceptualize the satisfaction of these basic needs as energizing processes for identity formation (Flum & Blustein, 2000; Guay et al., 2003). As such, the satisfaction of the needs for autonomy, competence, and relatedness would constitute an important internal resource to tackle the identity formation process. An instantiation of this model would be, for instance, that satisfaction of the need for competence in daily life would increase individuals' confidence in being able to make firm and self-endorsed identity commitments.

Second, the identity main-effects model assumes that one's identity influences developmental changes in basic need satisfaction. Because identity formation can be viewed as a process on the pathway to achieving one's short- and long-term goals, a successful resolution of this task is likely to play into the satisfaction of these basic needs. Put differently, by providing individuals with a sense of purpose and goal-directedness, identity formation can allow for greater satisfaction of one's basic needs over time. An instantiation of this model would be, for instance, that being able to make firm identity commitments matching one's life plans would increase one's feelings of choice and psychological freedom over time.

Finally, the integration of both these main-effect models gives rise to a third, reciprocal effects model, which assumes that identity formation and basic need satisfaction develop as part of a mutually reinforcing system, with both influencing each other across time (Caspi & Roberts, 1999). In this respect, Ryan and Deci (2003) explicitly stated that basic need satisfaction and iden-

tivity formation probably reinforce one another in reciprocal fashion, with one variable being a developmental asset to achieve the other, and vice versa. As such, we hypothesized that the reciprocal effects model would be substantiated by our data. However, in line with our view of need satisfaction as an energizing process toward identity formation, we hypothesized that the paths from the satisfaction of the needs to the identity dimensions would be more pronounced than the reverse paths.

Method

Participants and Procedure

Sample 1 consisted of 343 twelfth grade students (39.7% women; M age = 17.96 years, SD = 0.64; range = 16–20 years) from the academic track recruited from five high schools situated in the northern part of Flanders, the Dutch-speaking part of Belgium. Participation was voluntary and anonymity was guaranteed. Questionnaires were administered during a regular class period. Sample 2 consisted of 371 freshman students (77.5% women; M age = 18.25 years, SD = 1.26; range = 17–30 years) from the Faculty of Psychology and Educational Sciences at the University of Louvain, a college town located in the center of Flanders. This university mainly attracts Caucasian students from middle-class backgrounds. Participation was voluntary, anonymity was guaranteed, and participants received course credit for attending the group testing sessions. Participants in both Samples 1 and 2 signed a standard consent form before participating. Changes in identity formation are likely to take place during the first months of college because students evaluate their chosen study major in light of their expectations, wishes, and college experience during this time. Hence, we decided to follow up with the college participants of Sample 2 four months after their initial participation in the study (i.e., at the beginning of the second semester). At Time 2, a total of 309 participated again (representing an 83% participation rate). Participants with and without complete data were compared using R. J. A. Little's (1988) missing completely at random test. This yielded a nonsignificant chi-square value, $\chi^2(61) = 5.71$, ns , suggesting that missing values could be reliably estimated. Consequently, to minimize attrition bias (Schafer & Graham, 2002), we used the expectation maximization algorithm available in SPSS Version 11.5 to impute missing data.

Measures

Basic need satisfaction. Need satisfaction was measured by three items for each need on 5-point Likert-type scales ranging from 1 = *completely disagree* to 5 = *completely agree*, using the questionnaire developed by Sheldon, Elliot, Kim, and Kasser (2001). Sheldon et al. (2001) provided clear evidence for the factorial structure of this questionnaire in both North American and South Korean college student samples. The questionnaire was translated into Dutch according to the guidelines of the International Test Commission (Hambleton, 1994). Sample items are "I feel that my choices are based on my true interests and values" (autonomy satisfaction), "I feel that I can successfully complete difficult tasks and projects" (competence satisfaction), and "I feel a sense of contact with people who care for me, and whom I care for" (relatedness satisfaction). Cronbach's alphas were .68, .69,

and .80, respectively, in Sample 1; .66, .64, and .72, respectively, in Sample 2 (Time 1); and .64, .66, and .76, respectively, in Sample 2 (Time 2). Further, for the correlational and cross-lagged analyses, a total need satisfaction measure was created by summing and averaging all need satisfaction items (Vansteenkiste, Soenens, Lens, & Luyckx, 2006). Cronbach's alpha was .81 in Sample 1, .78 in Sample 2 (Time 1), and .77 in Sample 2 (Time 2).

Confirmatory factor analysis was used to check the factor structure of this questionnaire and its longitudinal invariance across time in the present samples. In all estimated models, we used standard model fit indices (Kline, 2006). The chi-square index, which tests the null hypothesis of perfect fit to the data, should be as small as possible; the root mean square error of approximation (RMSEA) should be less than .08; the comparative fit index (CFI) should exceed .90 and preferably .95; and the standardized root mean square residual (SRMR) should be less than .10. Because preliminary analyses indicated nonnormality in the data, the Satorra and Bentler (1994) scaled chi-square statistic ($SBS-\chi^2$) was used. Confirmatory factor analysis indicated that a three-factor model fitted the data adequately in Sample 1, $SBS-\chi^2(24, N = 333) = 70.76$, RMSEA = .08, CFI = .96, SRMR = .06, and at both waves of Sample 2, $SBS-\chi^2(111, N = 307) = 168.59$, RMSEA = .04, CFI = .97, SRMR = .05. Additionally, the null hypothesis of invariant pattern coefficients across time in Sample 2 would be rejected if at least two of the following criteria were satisfied (Vandenberg & Lance, 2000): $\Delta SBS-\chi^2$ significant at $p < .05$, $\Delta CFI \geq .01$, and the change in nonnormed fit index ($\Delta NNFI$) $\geq .02$. Although the NNFI was not used to evaluate the fit of a single model, it is extremely sensitive to small deviations or differences in model fit and is a useful tool in invariance testing (T. D. Little, 1997). Invariance tests indicated that the more parsimonious invariant model, $SBS-\chi^2(120, N = 307) = 175.26$, RMSEA = .04, CFI = .97, SRMR = .05, fitted the data equally well, $\Delta SBS-\chi^2(9, N = 307) = 6.97$, $p = .64$, $\Delta CFI < .01$, $\Delta NNFI < .01$.

Identity dimensions. The Dimensions of Identity Development Scale (Luyckx, Schwartz, et al., 2008) was used. The Dimensions of Identity Development Scale was originally developed in the Dutch language and proved to be a highly reliable instrument with a clear factor structure in Belgian Dutch-speaking high school and college student samples (Luyckx, Schwartz, et al., 2008). The identity dimensions were measured by five items each on 5-point Likert-type scales ranging from 1 = *completely disagree* to 5 = *completely agree*. Sample items read, "I have decided on the direction I want to follow in my life" (commitment making), "I sense that the direction I want to take in my life will really suit me" (identification with commitment), "I regularly think over a number of different plans for the future" (exploration in breadth), "I regularly talk with other people about the plans for the future I have made for myself" (exploration in depth), and "It is hard for me to stop thinking about the direction I want to follow in my life" (ruminative exploration). Cronbach's alphas were .83, .85, .76, .79, and .85, respectively, in Sample 1; .84, .80, .83, .77, and .83, respectively, in Sample 2 (Time 1), and .92, .84, .85, .82, and .84, respectively, in Sample 2 (Time 2). Confirmatory factor analysis indicated that the model comprising the five identity dimensions had an adequate fit to the data in Sample 1, $SBS-\chi^2(265, N = 330) = 737.56$, RMSEA = .07, CFI = .94, SRMR = .09, and at both waves of Sample 2, $SBS-\chi^2(1105, N = 301) = 2,013.62$,

RMSEA = .05, CFI = .96, SRMR = .09. In Sample 2, the more parsimonious invariant model, $SBS-\chi^2(1130, N = 301) = 2,089.91$, RMSEA = .05, CFI = .96, SRMR = .09, fitted the data equally well, $\Delta SBS-\chi^2(25, N = 301) = 98.47$, $p < .001$, $\Delta CFI < .01$, $\Delta NNNFI < .01$.

Results

Mean-Level Analyses

Preliminary analyses. First, we looked at possible mean differences between both samples using a one-way multivariate analysis of variance, resulting in a significant multivariate effect (Wilks's $\Lambda = .85$), $F(8, 675) = 15.47$, $p < .001$, $\eta^2 = .16$. As shown in Table 1, Sample 1 scored higher on competence satisfaction, exploration in breadth, and exploration in depth than did Sample 2 (Time 1). Further, in Sample 1, a multivariate effect of gender was found (Wilks's $\Lambda = .91$), $F(8, 320) = 4.11$, $p < .001$, $\eta^2 = .09$. Follow-up univariate analyses revealed significant gender differences (all $ps < .05$) for exploration in depth, ruminative exploration, and relatedness satisfaction, with women ($M = 3.48$, $SD = 0.64$; $M = 2.99$, $SD = 0.85$; and $M = 4.34$, $SD = 0.61$, respectively) scoring higher than men ($M = 3.23$, $SD = 0.72$; $M = 2.67$, $SD = 0.88$; and $M = 4.16$, $SD = 0.73$, respectively). In Sample 2, an overall multivariate effect of gender was found at Time 1 (Wilks's $\Lambda = .88$), $F(8, 361) = 6.47$, $p < .001$, $\eta^2 = .13$, but not at Time 2 (Wilks's $\Lambda = .96$), $F(8, 361) = 1.82$, $p = .07$, $\eta^2 = .04$. At Time 1, follow-up univariate analyses revealed significant gender differences (all $ps < .05$) for all three needs and exploration in depth. Men scored higher than women on autonomy ($M = 4.01$, $SD = 0.52$, vs. $M = 3.87$, $SD = 0.57$, respectively) and competence satisfaction ($M = 3.54$, $SD = 0.58$, vs. $M = 3.37$, $SD = 0.60$, respectively) but lower on relatedness satisfaction ($M = 4.02$, $SD = 0.54$, vs. $M = 4.28$, $SD = 0.53$, respectively) and exploration in depth ($M = 3.04$, $SD = 0.69$, vs. $M = 3.21$, $SD = 0.67$, respectively).

Second, to assess mean-level change in Sample 2, a multivariate repeated-measures analysis of variance was conducted (Wilks's $\Lambda = .80$), $F(8, 368) = 11.65$, $p < .001$, $\eta^2 = .20$. As shown in

Table 1, all variables increased across time, except for relatedness satisfaction and ruminative exploration. Additional analyses indicated that change was moderated by gender (Wilks's $\Lambda = .95$), $F(8, 361) = 2.59$, $p < .05$, $\eta^2 = .05$. Women experienced stronger increases in autonomy and competence satisfaction than men, whereas only men experienced an increase in relatedness satisfaction.

Cluster analysis. Cluster analysis on the identity dimensions was conducted in the combined sample using a two-step procedure (Gore, 2000). First, a hierarchical cluster analysis based on squared Euclidian distances was carried out using Ward's method. Prior to conducting the analysis, we removed 17 univariate (i.e., values more than 3 standard deviations below or above the mean) and multivariate outliers (i.e., individuals with high Mahalanobis distance values; Garson, 1998). On the basis of substantive theorizing, parsimony, and explanatory power, six clusters were retained. Second, the initial cluster centers were used as nonrandom starting points in an iterative *k*-means clustering procedure (Gore, 2000). Figure 1 presents the final cluster solution, explaining between 57% and 64% of the variance in the identity dimensions. The *y*-axis in Figure 1 represents *z* scores, which were interpreted as effect sizes (Scholte, van Lieshout, de Wit, & van Aken, 2005). Analogous to Cohen's (1988) *d*, 0.2 standard deviations is a small effect, 0.5 standard deviations a moderate effect, and 0.8 standard deviations a large effect.

As expected, the achievement cluster (10% of the sample) scored the highest on all dimensions, except for a low score on ruminative exploration. Foreclosure (20%) scored high on the commitment dimensions, moderate on exploration in breadth and in depth, and low on ruminative exploration. Ruminative moratorium (19%) scored moderate to moderately high on the commitment dimensions and high on exploration. Carefree diffusion (15%) scored moderately low to low on all identity dimensions. Diffused diffusion (16%), however, scored low on the commitment dimensions, moderate on exploration in breadth and in depth, and high on ruminative exploration. Finally, the undifferentiated cluster (20%) achieved intermediate scores on all identity dimensions. To examine the stability of these clusters across both sam-

Table 1
Univariate Analyses of Variance, Means, Standard Deviations, and F Values for Both Samples

Variable	Sample 1		Sample 2 (Time 1)		Sample 2 (Time 2)		<i>F</i> ^a	η^2	<i>F</i> ^b	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Need satisfaction										
Autonomy satisfaction	3.98	0.65	3.90	0.56	4.02	0.44	2.46	<.01	18.61***	.05
Competence satisfaction	3.68	0.64	3.41	0.59	3.63	0.51	32.72***	.05	54.89***	.13
Relatedness satisfaction	4.23	0.69	4.22	0.54	4.27	0.47	0.01	<.01	3.10	.01
Identity										
Commitment making	3.48	0.67	3.44	0.65	3.67	0.79	0.01	<.01	42.32***	.10
Identification with commitment	3.44	0.75	3.43	0.64	3.63	0.62	0.08	<.01	41.59***	.10
Exploration in breadth	3.76	0.62	3.38	0.69	3.52	0.69	53.51***	.07	17.45***	.05
Exploration in depth	3.35	0.69	3.17	0.68	3.40	0.69	8.14**	.01	35.72***	.09
Ruminative exploration	2.79	0.88	2.74	0.70	2.72	0.72	0.68	<.01	0.23	<.01

^a *F* values represent differences between mean scores for Sample 1 and Sample 2 (Time 1). ^b *F* values represent differences between mean scores for Sample 2 (Time 1) and Sample 2 (Time 2).

** $p < .01$. *** $p < .001$.

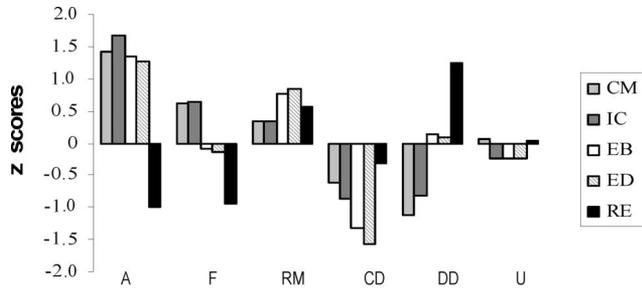


Figure 1. Final cluster solution in the combined sample. The figure shows z scores for commitment making (CM), identification with commitment (IC), exploration in breadth (EB), ruminative exploration (RE), and exploration in depth (ED) in the achievement (A), foreclosure (F), ruminative moratorium (RM), carefree diffusion (CD), diffused diffusion (DD), and undifferentiated (U) clusters, respectively.

ples, we used a double-split cross-validation procedure, and solutions were compared by means of Cohen’s kappa (Tinsley & Brown, 2000). Agreement of at least .60 is considered acceptable (Asendorpf, Borkenau, Ostendorf, & van Aken, 2001). The resulting kappa was .81, attesting to the stability of the six-cluster solution across both samples. Further, ancillary analyses attested to the stability of the six-cluster solution across gender ($\kappa = .69$).

A multivariate analysis of variance was conducted with cluster membership as independent variable and the three needs as dependent variables (Wilks’s $\Lambda = .74$), $F(5, 676) = 14.11$, $p < .001$, $\eta^2 = .09$. Follow-up univariate analyses are shown in Table 2. Achievement yielded the highest scores on all three needs; foreclosure and ruminative moratorium displayed the second highest scores on the needs, with neither cluster differing significantly from achievement on relatedness satisfaction. Finally, in general, the three remaining clusters (especially diffused diffusion) had the lowest need satisfaction scores.

Correlational Analyses

Concurrent associations. Tables 3 and 4 present all correlations in Samples 1 and 2. Highly similar correlations between identity and need satisfaction emerged in Samples 1 and 2. In general, total need satisfaction and all three separate needs were positively related to the identity dimensions, except for the ex-

pected negative relations with ruminative exploration. Multigroup comparisons across both samples indicated that the correlations between total need satisfaction and identity formation, $\Delta SBS-\chi^2(5, N = 694) = 9.52$, $p = .09$, $\Delta CFI < .01$, $\Delta NNNFI < .01$, and the correlations between the three separate needs and identity formation, $\Delta SBS-\chi^2(15, N = 694) = 11.34$, $p = .73$, $\Delta CFI < .01$, $\Delta NNNFI < .01$, could be constrained as equal across Sample 1 and Sample 2 (Time 1).

Cross-lagged associations. First, three models (i.e., a need-satisfaction main-effects model, an identity main-effects model, and a reciprocal effects model) assessing cross-lagged associations between total need satisfaction and the five identity dimensions were tested using structural equation modeling. In all models, all synchronous or within-time associations at Times 1 and 2 and all stability coefficients were controlled for (Asendorpf & van Aken, 2003). All parameter estimates in the subsequent models being tested were within their bounds (i.e., between -1.0 and 1.0).

The baseline model including all synchronous relations and all stability coefficients was estimated and provided an adequate fit to the data, $SBS-\chi^2(30, N = 371) = 74.43$, $RMSEA = .06$, $CFI = .98$, $SRMR = .10$. Next, we estimated a need-satisfaction main-effects model, $SBS-\chi^2(25, N = 371) = 49.22$, $RMSEA = .05$, $CFI = .99$, $SRMR = .07$, in which all five paths from total need satisfaction at Time 1 to the identity dimensions at Time 2 were allowed. Three out of the five paths were significant, with total need satisfaction at Time 1 positively predicting commitment making ($\beta = .10$, $p < .05$), identification with commitment ($\beta = .20$, $p < .001$), and exploration in breadth ($\beta = .13$, $p < .01$) at Time 2, leading to a trimmed need-satisfaction main-effects model, $SBS-\chi^2(27, N = 371) = 52.29$, $RMSEA = .05$, $CFI = .99$, $SRMR = .08$. We also estimated an identity main-effects model, $SBS-\chi^2(25, N = 371) = 67.65$, $RMSEA = .07$, $CFI = .98$, $SRMR = .10$, in which all five paths from the identity dimensions at Time 1 to total need satisfaction at Time 2 were allowed. Two paths were significant, with exploration in breadth at Time 1 positively influencing ($\beta = .11$, $p < .05$) and ruminative exploration at Time 1 negatively influencing ($\beta = -.10$, $p < .05$) total need satisfaction at Time 2, again leading to a trimmed identity main-effects model, $SBS-\chi^2(28, N = 371) = 68.45$, $RMSEA = .06$, $CFI = .98$, $SRMR = .10$. Finally, combining both models gave rise to a reciprocal effects model in which the five aforementioned significant cross-lagged paths remained significant, $SBS-$

Table 2

Univariate Analyses of Variance and Post Hoc Cluster Comparisons Based on Tukey’s Honestly Significant Difference Tests for the Six Clusters in the Combined Sample

Variable	Cluster												F	η^2
	Achievement		Foreclosure		Ruminative moratorium		Carefree diffusion		Diffused diffusion		Undifferentiated			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD		
Autonomy satisfaction	4.51 _a	0.44	4.13 _b	0.52	4.10 _b	0.50	3.69 _{cd}	0.59	3.59 _d	0.66	3.85 _c	0.50	32.09 ^{***}	.19
Competence satisfaction	4.12 _a	0.60	3.70 _b	0.54	3.68 _{bc}	0.54	3.35 _{de}	0.60	3.17 _e	0.62	3.46 _{cd}	0.53	27.79 ^{***}	.17
Relatedness satisfaction	4.51 _a	0.57	4.30 _{abc}	0.54	4.41 _{ab}	0.55	4.21 _{bc}	0.63	3.96 _d	0.69	4.14 _{cd}	0.54	10.77 ^{***}	.07

Note. Cluster means differ if they have different subscripts. ^{***} $p < .001$.

Table 3
Correlations Among All Variables of Sample 1

Variable	1	2	3	4	5	6	7	8	9
1. Total need satisfaction	—	.84***	.78***	.74***	.39***	.44***	.25***	.27***	-.31***
2. Autonomy satisfaction		—	.57***	.41***	.40***	.45***	.26***	.23***	-.30***
3. Competence satisfaction			—	.30***	.40***	.45***	.23***	.21***	-.32***
4. Relatedness satisfaction				—	.14*	.15**	.11*	.19**	-.13*
5. Commitment making					—	.68***	.37***	.29***	-.54***
6. Identification with commitment						—	.49***	.39***	-.47***
7. Exploration in breadth							—	.54**	-.01
8. Exploration in depth								—	.09
9. Ruminative exploration									—

* $p < .05$. ** $p < .01$. *** $p < .001$.

$\chi^2(25, N = 371) = 47.11$, RMSEA = .04, CFI = .99, SRMR = .07. This model provided a better fit to the data than did the baseline model, $\Delta\text{SBS-}\chi^2(5, N = 371) = 26.26, p < .001, \Delta\text{CFI} = .01, \Delta\text{NNFI} < .02$, and because of the inclusion of the cross-lagged paths, the variance explained at Time 2 increased from .23 to .31 for total need satisfaction, from .16 to .20 for commitment making, from .16 to .22 for identification with commitment, and from .18 to .21 for exploration in breadth as compared with the baseline model. Figure 2 presents a graphical depiction of this final model; all within-time correlations were left out for reasons of clarity.

To assess whether the structural relationships in this final model were invariant across gender, we performed a multigroup analysis in which we compared a constrained model (with all cross-lagged path coefficients set as equal across gender) with an unconstrained model (with all cross-lagged path coefficients allowed to vary across gender). No significant difference emerged, $\Delta\text{SBS-}\chi^2(5, N = 371) = 5.49, p = .36, \Delta\text{CFI} < .01, \Delta\text{NNFI} < .01$, indicating that the model fit equally well for men and women.

Second, we examined which of the three models referred to earlier would apply best to each of the three needs. For autonomy satisfaction, the trimmed need-satisfaction main effects model best represented the data, $\text{SBS-}\chi^2(27, N = 371) = 53.36$, RMSEA = .05, CFI = .99, SRMR = .08, with autonomy at Time 1 positively predicting commitment making ($\beta = .08, p < .05$), identification with commitment ($\beta = .13, p < .05$), and exploration in breadth ($\beta = .10, p < .05$) at Time 2. This model provided a better fit to the data than did the baseline model, $\Delta\text{SBS-}\chi^2(3, N = 371) =$

$9.72, p < .05, \Delta\text{CFI} = .01, \Delta\text{NNFI} < .02$, and because of the inclusion of the cross-lagged paths, the variance explained increased from .17 to .18 for commitment making, from .16 to .19 for identification with commitment, and from .19 to .21 for exploration in breadth as compared with the baseline model. A multigroup analysis indicated that this model fitted equally well for men and women, $\Delta\text{SBS-}\chi^2(3, N = 371) = 1.84, p = .61, \Delta\text{CFI} < .01, \Delta\text{NNFI} < .01$.

For competence satisfaction, the trimmed reciprocal effects model best represented the data, $\text{SBS-}\chi^2(26, N = 371) = 52.45$, RMSEA = .05, CFI = .99, SRMR = .08, with competence at Time 1 positively predicting commitment making ($\beta = .10, p < .05$), identification with commitment ($\beta = .19, p < .001$), and exploration in breadth ($\beta = .12, p < .01$) at Time 2 and exploration in breadth at Time 1 positively predicting competence at Time 2 ($\beta = .10, p < .05$). This model provided a better fit to the data than did the baseline model, $\Delta\text{SBS-}\chi^2(4, N = 371) = 20.71, p < .001, \Delta\text{CFI} = .01, \Delta\text{NNFI} \geq .02$, and because of the inclusion of the cross-lagged paths, the variance explained increased from .16 to .19 for commitment making, from .15 to .20 for identification with commitment, from .17 to .20 for exploration in breadth, and from .17 to .23 for competence satisfaction as compared with the baseline model. A multigroup analysis indicated that this model fitted equally well for men and women, $\Delta\text{SBS-}\chi^2(4, N = 371) = 14.26, p < .05, \Delta\text{CFI} < .01, \Delta\text{NNFI} < .01$.

Finally, for relatedness satisfaction, the trimmed reciprocal effects model best represented the data, $\text{SBS-}\chi^2(25, N = 371) = 53.30$, RMSEA = .06, CFI = .99, SRMR = .08, with relatedness

Table 4
Correlations Among All Variables of Sample 2 at Time 1 (Above Diagonal) and Time 2 (Below Diagonal)

Variable	1	2	3	4	5	6	7	8	9
1. Total need satisfaction	—	.82***	.79***	.73***	.39***	.52***	.15**	.26***	-.31***
2. Autonomy satisfaction	.81***	—	.49***	.42***	.37***	.52***	.21***	.30***	-.25***
3. Competence satisfaction	.81***	.53***	—	.32***	.34***	.45***	.08	.15**	-.29***
4. Relatedness satisfaction	.74***	.40***	.33***	—	.21***	.25***	.04	.15**	-.17**
5. Commitment making	.44***	.39***	.39***	.25***	—	.66***	.29***	.43***	-.41***
6. Identification with commitment	.57***	.50***	.50***	.33***	.74***	—	.42***	.53***	-.31***
7. Exploration in breadth	.38***	.28***	.37***	.25***	.49***	.54***	—	.66***	-.29***
8. Exploration in depth	.30***	.25***	.22***	.24***	.44***	.50***	.68***	—	.17**
9. Ruminative exploration	-.27***	-.25***	-.26***	-.11*	-.43***	-.31***	.06	.13*	—

* $p < .05$. ** $p < .01$. *** $p < .001$.

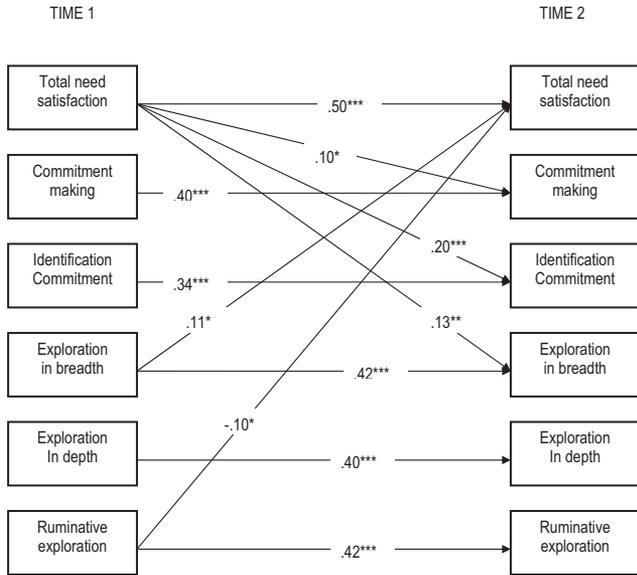


Figure 2. Final cross-lagged path model linking global need satisfaction and the identity dimensions. Within-time correlations are not presented for reasons of clarity. All path coefficients are standardized. * $p < .05$. ** $p < .01$. *** $p < .001$.

at Time 1 positively predicting commitment making ($\beta = .09, p < .05$), identification with commitment ($\beta = .14, p < .01$), and exploration in breadth ($\beta = .08, p < .05$) at Time 2 and negatively predicting ruminative exploration at Time 2 ($\beta = -.10, p < .05$). Further, ruminative exploration at Time 1 negatively predicted relatedness at Time 2 ($\beta = -.09, p < .05$). This model provided a better fit to the data than did the baseline model, $\Delta\text{SBS-}\chi^2(5, N = 371) = 16.80, p < .01, \Delta\text{CFI} = .01, \Delta\text{NNFI} < .02$, and because of the inclusion of the cross-lagged paths, the variance explained increased from .17 to .18 for commitment making, from .16 to .19 for identification with commitment, from .19 to .20 for exploration in breadth, from .17 to .19 for ruminative exploration, and from .21 to .24 for relatedness satisfaction as compared with the baseline model. Again, a multigroup analysis indicated that this model fitted equally well for men and women, $\Delta\text{SBS-}\chi^2(5, N = 371) = 4.29, p = .51, \Delta\text{CFI} < .01, \Delta\text{NNFI} < .01$.

Discussion

By integrating recent theorizing on identity development with the self-determination perspective on motivated behavior, we tried to develop an integrative view on adolescent self-definition. Both cross-sectional and longitudinal analyses were presented in two samples of high school and college students to shed light on the link between basic need satisfaction as put forward by SDT (Deci & Ryan, 2000; Vansteenkiste et al., 2008) and personal identity formation and evaluation (Luyckx, Schwartz, et al., 2008). Need satisfaction was, with few exceptions, positively related to commitment making, identification with commitment, exploration in breadth, and exploration in depth and negatively related to ruminative exploration in both samples. Further, individuals who achieved a sense of personal identity through the use of proactive exploration strategies scored the highest on all three needs. Indi-

viduals characterized by a diffused identity state in combination with a ruminative approach to identity issues experienced the greatest deficit in need satisfaction. Finally, cross-lagged analyses provided most evidence for a reciprocal effects model with identity formation and basic need satisfaction mutually reinforcing one another across time, although significant paths from need satisfaction to identity were somewhat stronger and outnumbered significant paths in the opposite direction. Despite some mean-level differences obtained between men and women in the present study, multigroup analyses indicated that these cross-lagged models applied equally well for men and women.

Development and Substantive Associations

First, although not of primary interest to the present study, the short-term mean-level developmental trends observed in need satisfaction and the identity dimensions were generally in line with existing literature on personality development demonstrating movement toward greater psychological maturity with increasing age (e.g., Neyer & Asendorpf, 2001) and with previous research indicating that the college context, with its numerous alternatives and possible life paths, can stimulate identity exploration and commitment (e.g., Luyckx, Goossens, & Soenens, 2006). Commitment making, identification with commitment, exploration in breadth, and exploration in depth substantially increased across time in Sample 2. Moreover, in line with the hypothesis that the unpredictability and instability of the transition from high school to college would hinder the satisfaction of the needs of autonomy and competence (Nelson & Barry, 2005), the college students of Sample 2 reported less autonomy and competence satisfaction at Time 1 (which was at the very beginning of the freshman year) than at Time 2. In this respect, they also reported less competence satisfaction at Time 1 than did the high school students in Sample 1.

Second, with respect to the associations between need satisfaction and the identity dimensions, we found longitudinal evidence for the energizing role of basic need satisfaction toward different identity dimensions. Not only was satisfaction of the total as well as the separate needs substantially and consistently related to the identity dimensions in both samples, satisfaction of all three needs influenced changes in identity formation across time. With respect to identity commitments, commitment making and especially identification with commitment were influenced by both total need satisfaction and the three separate needs. So, although scoring high on the three basic needs helps individuals in making identity choices as such, feeling autonomous and competent and being part of a respectful and empathic social network especially helps individuals in making identity choices that they endorse and with which they can identify. These findings are consistent with SDT, in which it is argued that although the satisfaction of one's basic needs might promote the commitment toward a particular identity option, need satisfaction is especially critical for the internalization or personal acceptance of one's chosen identity, such that the adopted identity emanates from one's sense of self. Indeed, the commitment toward a particular identity option can be prompted by external or intraindividual demands rather than one's personal interests and values, which might explain why need satisfaction is less strongly predictive of commitment making.

With respect to exploration, a thorough exploration in breadth of different alternatives was positively predicted by total need satisfaction and the three separate needs. The longitudinal findings for exploration in depth and ruminative exploration were less clear, with only relatedness satisfaction negatively predicting changes in ruminative exploration across time. When we looked at the unique associations in the cross-lagged path models, none of the observed cross-sectional associations between need satisfaction and exploration in depth appeared as substantial paths in the longitudinal analyses. The stronger association between need satisfaction and exploration in breadth is perhaps due to the fact that exploration in breadth could require more energy, as the gathering and comparison of information coming from different potential identity options requires quite some effort. Thus, the energizing advantage of experienced need satisfaction might become especially apparent for identity processes, like exploration in breadth, that seem to require substantial effort and energy. Future researchers need to replicate the current findings and might try to empirically examine this hypothesis.

In line with the idea of identity and basic need satisfaction being part of a transactional system mutually reinforcing one another (Ryan & Deci, 2003), we also found evidence for identity predicting over-time changes in need satisfaction. Specifically, exploration in breadth positively predicted and ruminative exploration negatively predicted changes in total need, competence, and/or relatedness satisfaction. Grotevant (1987) already defined identity exploration as problem-solving behavior constituting the “work” of identity. Apparently, being able to broadly explore available options provides one with a sense of competence, presumably because exploring the world forms a prerequisite for effectively handling the array of possible identity options. Moreover, by getting absorbed in the identity process, one might start to attract the support of others, such that one feels more closely connected to others over time. In contrast, getting stuck in the exploration process, thereby continually doubting possible choices, might undermine one’s need satisfaction, because one does not ultimately make any commitments at all.

Finally, an analysis of the different identity statuses or types and how they relate to need satisfaction complemented the previous findings. In line with our hypotheses, results showed that different combinations of the commitment and exploration dimensions could be differentiated on the basis of their need satisfaction scores. Therefore, it is important for counselors to not only look at how singular identity dimensions relate to or are influenced by need satisfaction but also look at how different groups of individuals tackle or resolve the identity puzzle and the degree to which these different individuals have their needs for autonomy, competence, and relatedness satisfied. Individuals with the highest need satisfaction scores were characterized by being in a state of identity achievement, signaling a state of a profound and personalized identity resolution (Marcia, 1980). The status of identity foreclosure was characterized by higher than average scores on the commitment dimensions, but these commitments were not accompanied by an intense phase of proactive exploration. Compared with individuals in the identity achievement status, these individuals felt less competent and autonomous in their everyday lives, which could explain why they did not put as much effort into personalized identity searches as achieved individuals did. Our results demonstrated that this lack of exploratory investment was

accompanied by commitments that were less strong and less identified with (Luyckx, Schwartz, et al., 2008). Individuals in diffused diffusion, however, scored relatively low on the three needs and, probably as a result of these lowered scores, were not able to proactively tackle the identity issues they were confronted with.

Counseling Implications

Identity interventions represent efforts to promote healthy identity development in individuals in need of structure and guidance. These interventions have as their primary objective the facilitation of movement from a less complete and coherent sense of identity to a more synthesized identity in which confusion and uncertainty are reduced (Josselson, 1994). Such interventions might be most relevant in contemporary societies that lack structure and guidance on which to rely in forming a sense of identity (e.g., Côté, 2000). The present findings suggest that the interplay between satisfaction of the basic needs of autonomy, competence, and relatedness and identity development may serve as an intervention tool to reduce identity confusion and to optimize identity achievement.

Although previous research has demonstrated the malleability of identity processes and the efficacy of certain intervention strategies (such as participatory learning strategies integrating cognitively and emotionally focused strategies; S. J. Schwartz, Kurtines, & Montgomery, 2005), the long-term maintenance of intervention gains was less than optimal (Ferrer-Wreder et al., 2002). In this respect, the present findings suggest that need satisfaction could represent an important mechanism through which long-term changes in identity formation can be established. This is because when people’s basic needs are satisfied, they are more inclined to broadly explore existing identity options and to deeply endorse particular options, both concurrently and over time. Indeed, within SDT, it is maintained that need satisfaction facilitates individuals’ natural inclination to move toward greater self-organization and integrated identity development, such that their developed identities represent a better expression of their own values and interests. As a result, the social environment can promote or detract people from such an endeavor, depending on the extent to which the environment provides inputs for people’s needs. As such, counselors might do well to provide a need-supportive environment (characterized by being empathic toward adolescents’ needs and by encouraging adolescents to act on personally endorsed values and needs), which is likely to contribute to a successful quest for one’s identity.

Previous research has indeed demonstrated that parents, for instance, can play an important role in encouraging proactive identity processes through autonomy-supportive versus controlling parenting practices and the provision of structure, such that children become steadily more aware of and start to behave according to self-initiated and authentic goals and values (Grolnick, 2003), which in turn promotes the formation of self-endorsed commitments. Parental autonomy support is highly incompatible with and, consequently, shows a strongly negative correlation with psychologically controlling parenting, which characterizes parents who lack any sense of attunement to their children’s needs and instead manipulate and pressure their children to act in accordance with the parents’ agenda (Soenens & Vansteenkiste, 2005). Likewise, previous research demonstrated the influence of educational environments on the achievement of a functional identity (Dreyer,

1994; Soenens & Vansteenkiste, 2005). Teachers' responses to the various roles adolescents experiment with can aid or interfere with basic need satisfaction and, hence, with the process of identity formation. For instance, for a college environment to contribute to healthy identity development, it is crucial that students feel that their academic work represents an investment of their own feelings and talents so that they can assume ownership of their own work and, consequently, experience autonomy, competence, and relatedness, which could facilitate their identity development, as demonstrated in the cross-lagged analyses of the present study.

Relatedly, combined with these previous research findings, the present study can have important implications for university counseling center psychologists who try, for instance, to break the cycle of distress that accompanies ruminative identity exploration in indecisive or undecided students. By attending to how a student's basic needs of autonomy, competence, and relatedness are fulfilled on a daily basis, counselors may find important points of departure to map out a dysfunctional identity process. By trying to stimulate general autonomy, competence, and relatedness experiences, counselors can influence self-endorsed identity commitment-making and exploratory strategies for the better (cf. Enright, Olson, Ganiere, Lapsley, & Buss, 1984).

Limitations and Suggestions for Future Research

The present study shows a number of limitations that need to be remedied in future research. First, we relied on self-report measures. Although questionnaires are most appropriate to gather information about identity development and need satisfaction, the sole reliance on a single informant may artificially inflate relations among constructs because of common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Second, the present sample consisted of Caucasian European participants, all originating from Belgium. Previous research has demonstrated that the basic processes involved in identity formation and need satisfaction, which are commonly identified in research on North American adolescents, seem to apply equally well to Belgian adolescents (e.g., Luyckx, Goossens, & Soenens, 2006). However, given the increased ethnic heterogeneity characterizing many Western countries, it may be important to replicate the present findings with non-White individuals (S. J. Schwartz, 2005). It remains to be investigated how basic need satisfaction and identity formation interrelate in non-Western cultures or in non-Whites living in Western cultures (who are a rapidly growing population among adolescents and young adults). Although SDT claims that the satisfaction of autonomy, competence, and relatedness should yield universally positive effects (Sheldon et al., 2001; Vansteenkiste et al., 2006) and although S. J. Schwartz, Côté, and Arnett (2005) found substantial consistency across three U.S. ethnic groups in identity constructs such as commitment and exploration, considerable intercultural variation in how basic needs get satisfied could occur and deserves empirical attention.

Finally, the present study operationalized basic need satisfaction and identity formation in relative isolation from several intra- and interindividual influences on the self-definition process. Previous research demonstrated that both identity formation and basic need satisfaction are embedded in a vast network of personality, psychosocial, and contextual correlates. As noted in the implications for counseling, both the social environment (such as parenting

practices) and intraindividual factors (such as one's personality) might facilitate or hinder need satisfaction and promote versus block one's development toward a more self-endorsed and integrated mode of functioning. An overarching framework needs to be used in future research that places basic need satisfaction, identity formation, and the interplay between both sets of variables in their psychosocial context. As such, it should be investigated, for instance, whether need satisfaction can be viewed as a mediating mechanism between social-contextual and personality factors and several identity processes, such as the making of and identification with identity commitments (Luyckx et al., 2007).

To conclude, in the present article, we attempted to bridge identity formation theorizing and the self-determination perspective on motivational dynamics, both being complementary frameworks focusing on the development of autonomous self-regulation and self-definition. We hope that the present study instigates researchers from different cultural contexts to study energizing processes in identity development from a contextualized and longitudinal point of view.

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Received August 20, 2008
 Revision received January 9, 2009
 Accepted January 13, 2009 ■



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